

1 WHAT IS CLAIMED IS:

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3 1. A method for preparing silica containing molecular sieves which may
4 be mixed with an organic polymer to create a mixed matrix membrane,
5 the method comprising:

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7 water washing silica containing molecular sieves sufficiently to produce
8 water washed molecular sieves which are substantially free of surface
9 remnants, such that when the water washed molecular sieves are
10 subjected to a Sieve Wash Conductivity Test, a wash filtrate is
11 produced having a conductivity of less than 110 micro mhos/cm.

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13 2. The method of claim 1 wherein:

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15 the conductivity is less than 80 micro mhos/cm.

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17 3. The method of claim 1 wherein:

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19 the conductivity is less than 50 micro mhos/cm.

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21 4. The method of claim 1 wherein:

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23 the conductivity is less than 30 micro mhos/cm.

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25 5. The method of claim 1 further comprising:

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27 a step of washing the silica containing molecular sieves with a basic
28 water solution having a pH of at least 9 prior to the water washing step.

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30 6. The method of claim 5 wherein:

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32 the basic water solution has a pH of at least 11.

- 1 7. The method of claim 1 wherein:
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3 the water washing is performed continuously until the silica containing
4 molecular sieves are substantially free of the surface remnants.
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- 6 8. The method of claim 1 wherein:
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8 the water washing is performed batch wise until the silica containing
9 molecular sieves are substantially free of the surface remnants.
10
- 11 9. The method of claim 1 further comprising:
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13 calcining the silica containing molecular sieves after the step of water
14 washing has produced sieves which are substantially free of surface
15 remnants.
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- 17 10. The method of claim 1 further comprising:
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19 silanating the water washed silica containing molecular sieves.
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- 21 11. A mixed matrix membrane comprising:
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23 a continuous phase organic polymer and water washed silica
24 containing molecular sieves which are dispersed throughout the
25 polymer;
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27 wherein the water washed silica containing molecular sieves are
28 sufficiently water washed to remove surface remnants prior to being
29 dispersed into the organic polymer such that if the water washed silica
30 containing molecular sieves are subjected to a
31 Sieve Wash Conductivity Test, a wash filtrate is produced having a
32 conductivity of less than 110 micro mhos/cm.

- 1 12. The mixed matrix membrane of claim 11 wherein:
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3 the water washed silica containing molecular sieves are sufficiently
4 water washed to remove surface remnants prior to being dispersed into
5 the organic polymer such that if the water washed silica containing
6 molecular sieves are subjected to a Sieve Wash Conductivity Test, a
7 wash filtrate is produced having a conductivity of less than
8 80 micro mhos/cm.
9
- 10 13. The mixed matrix membrane of claim 11 wherein:
11
12 the water washed silica containing molecular sieves are sufficiently
13 water washed to remove surface remnants prior to being dispersed into
14 the organic polymer such that if the water washed silica containing
15 molecular sieves are subjected to a Sieve Wash Conductivity Test, a
16 wash filtrate is produced having a conductivity of less than
17 50 micro mhos/cm.
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- 19 14. The mixed matrix membrane of claim 11 wherein:
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21 the water washed silica containing molecular sieves are sufficiently
22 water washed to remove surface remnants prior to being dispersed into
23 the organic polymer such that if the water washed silica containing
24 molecular sieves are subjected to a Sieve Wash Conductivity Test, a
25 wash filtrate is produced having a conductivity of less than
26 30 micro mhos/cm.
27
- 28 15. The mixed matrix membrane of claim 11 wherein:
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30 the water washed silica containing molecular sieve is silanated prior to
31 being dispersed with the organic polymer.

- 1 16. A method of making a mixed matrix membrane, the method comprising
2 the steps of:
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4 water washing silica containing molecular sieves sufficiently to produce
5 water washed molecular sieves which are substantially free of surface
6 remnants, such that when the water washed molecular sieves are
7 subjected to a Sieve Wash Conductivity Test, a wash filtrate is
8 produced having a conductivity of less than 110 micro mhos/cm;
9
10 dispersing the water washed molecular sieves into a solvated organic
11 polymer; and
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13 allowing the organic polymer to dry thereby creating a mixed matrix
14 membrane comprising an organic polymer with the water washed
15 molecular sieves dispersed therein.
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- 17 17. The method of claim 16 wherein:
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19 the wash filtrate has a conductivity of less than 80 micro mhos/cm.
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- 21 18. The method of claim 16 wherein:
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23 the wash filtrate has a conductivity of less than 50 micro mhos/cm.
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- 25 19. The method of claim 16 wherein:
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27 the wash filtrate has a conductivity of less than 30 micro mhos/cm.
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- 29 20. A process for separating component gases of a gas mixture comprising
30 the steps of:
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32 providing a mixed matrix membrane comprising molecular sieves
33 dispersed in a continuous phase of a polymer in which the sieves have

1 been sufficiently super water washed prior to being incorporated into
2 the continuous phase to be substantially free of surface remnants, such
3 that when the water washed molecular sieves are subjected to a
4 Sieve Wash Conductivity Test, a wash filtrate is produced having a
5 conductivity of less than 110 micro mhos/cm;
6
7 contacting a gas mixture, including component gases, on one side of
8 the membrane to cause the component gases to selectively permeate
9 the membrane; and
10
11 removing from the opposite side of the membrane a permeate gas
12 composition enriched in concentration in at least one of the component
13 gases.
14
15 21. The process of claim 20 wherein:
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17 the wash filtrate has a conductivity of less than 80 micro mhos/cm.
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19 22. The process of claim 20 wherein:
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21 the wash filtrate has a conductivity of less than 50 micro mhos/cm.
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23 23. The process of claim 20 wherein:
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25 the wash filtrate has a conductivity of less than 30 micro mhos/cm.